Appl. No. 10/044,385
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group dated April 6, 2004

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-7 (canceled).

8.   (Currently Amended) A method to create a digital model of a patient's teeth, comprising:

creating an impression of the patient's teeth;

scanning the impression using an X-ray source; and

generating the digital model with scanned data~~The method of claim 1~~, wherein an upper teeth impression, a lower teeth impression and a bite impression ~~is~~ are scanned together.

9.   (Original) The method of claim 8, further comprising digitally reversing data from the upper and lower impression scan data to make positive data.

10.   (Original) The method of claim 9, wherein the digital reversing identifies inner surfaces of an impression material and extracting the inner surfaces using a largest connected component algorithm.

11.   (Currently Amended) The method of claim ~~1~~ 8, further comprising aligning data into a bite position using the bite material scanned.

12.   (Currently Amended) The method of claim ~~1~~ 8, further comprising digitally detailing the teeth data.

13.   (Currently Amended) The method of claim ~~1~~ 8, further comprising setting a final bite.

14.   (Currently Amended) The method of claim ~~1~~ 8, further comprising articulating the digital model.

15.   (Currently Amended) The method of claim ~~1~~ 8, further comprising treating a patient using the digital model.

16.   (Currently Amended) The method of claim ~~1~~ 8, further comprising:

generating a computer representation of a masticatory system of the patient; and

determining an occlusion from the computer representation of the masticatory system.

17.   (Original) The method of claim 16, wherein the occlusion is a static occlusion, further comprising:

modeling an ideal set of teeth;

automatically applying the ideal set of teeth to the computer representation of a masticatory system of the patient; and

optimizing the position of the patient's teeth to fit the ideal set of teeth.

18.   (Original) The method of claim 17, wherein the modeling step further comprises selecting one or more arch forms specifying the ideal set of teeth.

19.   (Original) The method of claim 17, wherein the masticatory system includes jaws and wherein the applying step includes:

registering a model of the upper and lower teeth with a model of the masticatory system;

simulating the motion of the jaws to generate contact data between the upper and lower teeth; and

placing a tooth in a final position based on the contact data.

20.   (Original) The method of claim 19, wherein the model is registered using X ray data.

Appl. No. 10/044,385
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group dated April 6, 2004

PATENT

21.   (Original) The method of claim 19, wherein the model is registered using computed tomography data.

22.   (Original) The method of claim 19, wherein the model is registered using data associated with a mechanical model.

23.   (Original) The method of claim 19, wherein the simulating step further comprises applying kinematics to the model of the teeth.

24.   (Original) The method of claim 19, wherein the simulating step further comprises applying a constrained motion to the model of the tooth.

25.   (Original) The method of claim 19, wherein the placing step is based on a measure of undesirability to the contacts.

26.   (Original) The method of claim 25, further comprising optimizing the position of the tooth according to the measure of undesirability.

27.   (Original) The method of claim 26, further comprising minimizing the measure of undesirability.

28.   (Original) The method of claim 27, wherein the measure of undesirability is a function of one or more of Peer Assessment Rating (PAR) metrics, distance-based metrics and shape-based metrics.

29.   (Original) The method of claim 17, wherein the simulating step includes providing a library of motions.

30.   (Original) The method of claim 29, wherein the library of motions includes a protrusive motion.

Appl. No. 10/044,385
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group dated April 6, 2004

PATENT

31.   (Original) The method of claim 29, wherein the library of motions includes a lateral motion.

32.   (Original) The method of claim 29, wherein the library of motions includes tooth-guided motions.

33.   (Original) The method of claim 17, wherein the simulating step includes applying physical forces to one jaw.

34.   (Original) The method of claim 17, wherein the placing step further includes updating the computer representation of the masticatory system with new patient data.

35.   (Original) The method of claim 34, wherein the patient has a first teeth model, further comprising:

scanning the teeth of the patient to generate a second teeth model;

matching the second teeth model with the first teeth model;

applying a final position transform to the second teeth model; and

adjusting the position of teeth in the second model based on new information.

Claims 36 - 40 (Canceled).